CASE REPORT

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Simultaneous resection on the patient with synchronous colorectal liver metastasis: two cases report

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ABSTRACT

Background: Colorectal cancer (CRC) is ranked as the third most common cancer worldwide. One of the leading causes of death in CRC patients is due to its metastasis. The liver is the most common site of metastasis. The best treatment to achieve long-term survival and cure patients with CRC liver metastasis is surgery, whether it's sequential, delayed, or simultaneous resection. This case study aims to evaluate the simultaneous resection on the patient with synchronous colorectal liver metastasis.

Case Presentation: From January-June 2020, in Prof. Dr. R. D. Kandou General Hospital, Manado, 2 patients were treated with simultaneous resection for CRC with resectable synchronous liver metastasis. Blood loss, bile leak, ascites, and post hepatectomy liver failure (PHLF) were observed as outcome parameters.

Conclusion: Simultaneous resection is safe and exhibits advantages in the long-time survival of patients. However, the incidence of complications and mortality are higher in simultaneous resection than in staged resection.

Keywords: Colorectal Cancer, Liver Metastases, Liver Resection.
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INTRODUCTION

Colorectal cancer refers to developing cancer that begins as a tumor or tissue growth on the rectum or colon's inner lining. It subsequently grows into blood vessels or lymph vessels. Then it's increasing the chance of metastasis to other anatomical sites.[1] Colorectal cancer is ranked as the third most common cancer worldwide.[2] In terms of mortality, colorectal cancer is the fourth most common cancer in the world. It is more common in developed countries in geography, with Australia and New Zealand being the countries with the highest incidence.[2]

The leading cause of death in patients with colorectal cancer is because of its metastasis. Worldwide mortality is increasing; however, it has decreased in some regions of Europe, North America, and Asia.[1,2] It is primarily due to the application of screening methods related to early diagnosis and treatment. On the other hand, the life expectancy of patients with colorectal cancer has increased and has been achieved with screening, early diagnosis, novel chemotherapy agents, and improvements in radiotherapy and surgical techniques.[2] Due to its anatomical situation concerning portal circulation, the liver is the most common metastasis site in patients with colorectal cancer.

Eventually, about 70% of patients with colorectal cancer will develop metastasis in the liver.[2] Almost 50% of colorectal patients will develop liver metastasis during the course. However, 15-25% of its patients already have liver metastasis when diagnosing primary colorectal cancer.[3] From among 1.450.000 patients with colorectal cancer with a recent diagnosis of colorectal cancer, it is expected that 30.000 to 40.000 will develop synchronous metastasis (one-third of cases) metachronous metastasis (two-third of cases) confined to the liver.[2,3] The best treatment to achieve long-term survival or even cure in patients with colorectal patients with liver metastasis is surgery. That means colorectal cancer with synchronous liver metastasis requires resection of both colorectal cancer and also liver metastasis. Until now, there are three sequences of surgical therapy a surgeon can perform, which are sequential, delayed, or simultaneous resection. There are still no established standards for them, and still debatable which one is the best or preferred.[3]

The treatment strategy for colorectal liver metastases (CRLM) has evolved. The ongoing need to preserve normal liver parenchymal and the expansion of resectability criteria for CRLM has led to the development of parenchymal-sparing liver surgery (PSLS) or parenchymal-sparing hepatectomy (PSH).[3,4]

One of the feared complications is post hepatectomy liver failure (PHLF). It is a complication after hepatic resection and a significant cause of perioperative mortality.[5] Few studies provided a grading of PHLF, namely the Balzan "50-50 Criteria", Mullen Criteria, and

PHLF criteria by ISGLS (International study group of liver surgery). While postoperative morbidity can be measured or classified using the Clavien-Dindo classification or FABIB criteria (Failure, Ascites, Bile leakage, Infection, Bleeding).[5] Based on those mentioned above, this case study aims to evaluate the simultaneous resection on the patient with synchronous colorectal liver metastasis on two cases report.

CASE REPORT

From January - June 2020, in Prof. Dr. R. D. Kandou Hospital, Manado, there were 2 patients treated surgically for colorectal cancer with synchronous liver metastasis. They underwent simultaneous resection without having prior chemotherapy. The perioperative data were reviewed below to present this serial case (Table 1).

The two patients underwent simultaneous resection, with non-anatomical liver resection for the liver metastasis, accordingly with the parenchymal sparring liver resection principles. Thulium-Doped Fiber Laser (TDFL) was used as an energy device (Table 2).

Postoperatively, we evaluate the morbidities and incidence of PHLF. Postoperative morbidities were evaluated using Clavien-Dindo and FABIB criteria, while PHLF with the PHLF criteria by the ISGLS (Figure 1).

The first patient is male, 61 years old, with adenocarcinoma colon of hepatic flexure (cT4N2M1) infiltrating duodenum pars 2; right hemicolectomy, primary repair D2, and pyloric exclusion were performed, along with non-anatomical liver resection of segment 7-8. Blood loss was mostly due to definitive surgery for the CRC. It was 850 cc from primary tumor resection and 50 cc from liver resection (Table 1 and 2).

The second patient is male, 70 years old, with distal third adenocarcinoma recti (cT4bN2M1). Abdominoperineal resection with total mesorectal excision and non-anatomical liver resection segment 3-7 was performed. Total blood loss was 500 cc. It was 450 cc from Miles' procedure and 50 cc from the liver resection. Glissonean pedicle approach was performed for liver hilum control. Postoperative bile leak, ascites, PHLF, and mortality were not detected (Table 3).

DISCUSSION

Synchronous metastasis (SM) is defined as a condition when a patient presents with the metastatic liver disease while presenting the primary disease.[4] Abelson et al. have demonstrated that resection of CRC liver metastasis offers a significant survival benefit. Historically, patients with the synchronous disease were offered a staged resection.[6] However, after the improved liver surgery techniques, recent literature has demonstrated that simultaneous resection can be performed safely in highly selected patient populations.[6]

A simultaneous resection patient doesn't need a second surgery, thereby decreasing the length of stay and healthcare costs. Overall, there is no consensus on what the standard of care should be. The data are mixed concerning the risk and benefits of the simultaneous vs. staged approaches.[6]

However, in this study, we chose to use simultaneous resection in these patients. Simultaneous resection is a single-stage resection of primary colorectal cancer dan liver metastasis simultaneously. We decide to choose this method for some reasons. It has been reported that simultaneous resection doesn't necessarily increase the incidence of postoperative complications compared with staged resection.[3] It was also associated with reduced health care utilization, including reduced likelihood of readmission, prolonged length of stay, and high charges.[6] The postoperative

Table 1. Baseline characteristic of case study

Patient's ID	Sex	Age	Colorectal cancer	Synchronous metastasis
1	Male	61	Adenocarcinoma hepatic flexure (T4N2M1), **Total number of Tumors** = 1, **Diameter of the largest tumor** = ± 15x17 cm	Liver metastasis Segment 7-8
2	Male	70	Adenocarcinoma recti 1/3 distal (cT4bN2M1), **Total number of Tumors** = 1, **Diameter of the largest tumor** = ± 6x7 cm	Liver metastasis Segment 3-7

Table 2. The operation characteristics

Variables	1st patient	2nd patient
Methods of resection	Open	Open
Vascular control	**Glissonean Pedicle approach**	**Glissonean Pedicle approach**
Operation	Non Anatomical liver resection segment 7-8	Non Anatomical liver resection segment 3-7
Complexity features	Associated enteric resection and reconstruction = right hemicolectomy + anastomosis ileo-colica end to end + primary repair D2 + pyloric exclusion + gastrojejunostomy bypass	Associated enteric resection and reconstruction = Abdominoperineal resection (Miles' Procedure) + Total Mesorectal Excision (TME) + complex adhesiolysis
Exposure	Right Lobe mobilization	Right Lobe mobilization
Energy device Parenchymal Transection	Thulium Doped Fiber Laser (TDFL)	Thulium Doped Fiber Laser (TDFL)
Intra-op and 1st 24 hours post-op bleeding	850 cc (from primary tumor resection), 50 cc (from liver resection)	450 cc (from Miles' Procedure) 50 cc (from liver resection)

Table 3. Morbidity and PHLF

Parameters	PHLF -ISGLS	Clavien-Dindo	FABIB
1st patient	None	Grade 2 =1 (transfusion)	Infection = grade A
2nd patient	None	Grade 1 = 1 (wound infection)	Infection = grade A

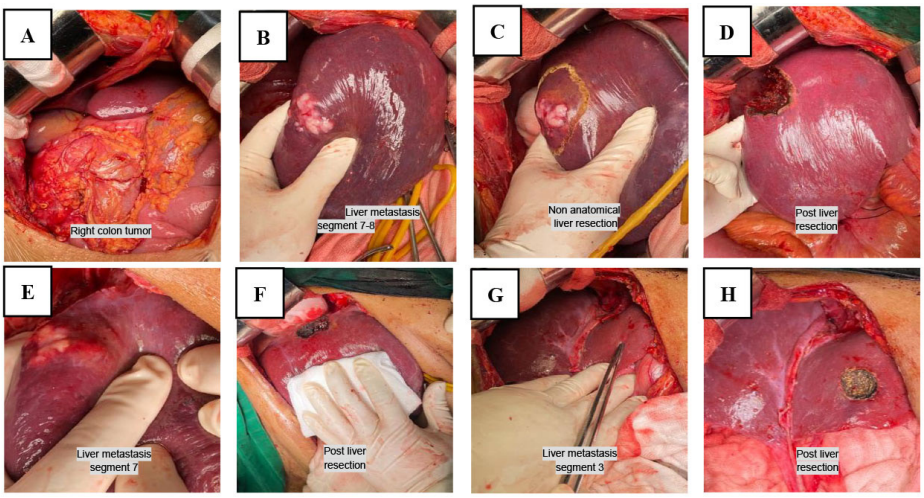

Figure 1. Intraoperative procedure on Patient 1 (A, B, C, and D) and Patient 2 (E, F, G, and H)

outcomes were evaluated using Clavien-Dindo and FABIB criteria. In contrast, the PHLF was assessed with the PHLF criteria by the ISGLS.

Clavien-Dindo is a tool to assess and report postoperative complications in general surgery. Most documentation uses this to report surgery-related morbidity and mortality in a single surgery field or even a particular intervention.[7] In our first patient, the Clavien-Dindo was grade 2. He needed a blood transfusion due to the blood loss after primary tumor resection. For our second patient, the Clavien-Dindo was grade 1. The patient got a wound infection because the operation was classified as clean-contaminated surgery. At the same time, FABIB criteria is a liver surgery-specific complication grading system, in addition to the Clavien-Dindo severity grading system. It is applicable in clinical practice. The acronym 'FABIB' describes liver failure, ascites, bile leakage, infection, and bleeding.[8] In this case, we found out there was infection after the surgery. It was because of the clean-contaminated surgery.

In 2005, Balzan S et al. published a study regarding PHLF.[9] They identified PHLF characterized by the combination of prothrombin time index <50% and serum bilirubin >50 nmol, i.e. (i.e., 2.9 mg/dL) on postoperative day 5, to be a strong predictor of postoperative mortality.[9] Another study by Mullen JT et al. was designed to provide a standard definition of PHLF in a population of patients with normal preoperative liver function.[10] A peak serum bilirubin concentration >70 mg/dL predicted strongly liver-related death and worse postoperative outcomes after major hepatectomy.[10]

Definition of Post Hepatectomy Liver Failure (PHLF) by ISGLS is a postoperatively acquired deterioration in the ability of the liver (in patients with normal and abnormal liver function) to maintain its synthetic, excretory, and detoxifying functions, characterized by an increased INR (or need of clotting factors to maintain normal INR) and hyperbilirubinemia (according to the normal cut-off levels defined by the local laboratory) on or after postoperative day 5.[5] If INR or serum bilirubin concentration is increased preoperatively, PHLF is characterized by an increasing INR (decreasing prothrombin time) and increasing serum bilirubin concentration on or after postoperative day 5 (compared with the values of the previous day). Other apparent causes for the observed biochemical and clinical alterations such as biliary obstruction should be ruled out.[5] In these two case reports, there was no PHLF found. The concept of tumor resectability in colorectal liver metastasis (CLM) has evolved in the past decades. This development is known as "parenchymal-sparing liver surgery" (PSLS) for secondary liver tumors. Tumor removal avoiding the unnecessary sacrifice of functional parenchyma has been associated with less surgical stress and fewer postoperative complications.[11] As we applied the PSLS principles in our two cases, we performed the non-anatomical resection of the liver metastasis, saving most of the healthy liver parenchyma, therefore reducing the risk of PHLF.

We performed the Glissonean pedicle approach for liver hilum control. The glissonean pedicle approach has provided in-depth knowledge of the surgical anatomy of the liver. It has made different types of hepatectomy possible, including hemihepatectomy and small anatomical hepatectomies, such as sectionectomy and Couinaud's segmentectomy in a cirrhotic liver.[12]

The Thulium-Doped Fiber Laser (TDFL) was used as an energy device in this liver surgery. TDFL is a novel energy device for the resection of solid organ parenchyma. It's use is still rare and uncommon. TDFL knowns to be an effective tool for precise surgical procedures and provide better control for blood loss. Which in turn help minimize the bleeding from liver resection in our cases.[13]

CONCLUSION

Simultaneous resection is safe and exhibits advantages in the long-time survival of patients. We found out there were not any mortality and morbidity in these two cases. Postoperative bile leak, ascites, PHLF, and mortality were not detected. However, the incidence of complications and mortality are higher in simultaneous resection than in staged resection.

CONFLICT OF INTEREST

The authors declare that there is no competing interest regarding the manuscript.

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AUTHOR CONTRIBUTIONS

All authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to account for all aspects of the work.

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